WHAT IS CLAIMED IS:

1. A transmitting apparatus which constructs a ring
network capable of transmitting in first and second
directions via first and second tansmission lines
5   respectively, said transmitting apparatus cross
connecting and transmitting main signals on respective
channels, which enter via one of the first and second
transmission lines to which working and protection
channels have been assigned, and rescuing a main signal
10 when a transmission line fails by looping back the main
signal in the opposite direction using the protection
channel of another transmission line, said apparatus
comprising:

    an unrescuable failure discrimination unit for
15 determining whether failure for which rescue is
impossible has occurred in each channel of a second
group, wherein channels that are the object of rescue by
loop-back are classified to a first group of channels
which are set so as not to be rescued by loop-back and a
20 second group of channels other than the first group of
channels and a channel of the first group is refered to
as an non-rescue channel;

    non-rescue information storage means for storing
non-rescue information which indicates whether a channel
25 that is the object of rescue by loop-back is a non-
rescue channel; and

    discrimination-result insertion means which, on the
basis of main-signal cross-connect information,

interchanges a result of discrimination of each channel

of the second group and inserts the interchanged result

of discrimination in the main signal of the

corresponding channel after cross connect.

5   2.   The apparatus according to claim 1, further

comprising:

ring-type storage means for storing ring type which

specifies transmission rate of ring network to which the

transmitting apparatus is connected; and

10   a channel decision unit for deciding, on the basis

of the ring-type information and non-rescue information,

whether each channel that is the object of rescue is the

channel of the second group;

wherein said non-rescue information storage means

15   has a storage area for storing, on a per-ring-type

basis, non-rescue information which specifies whether a

channel that is the object of rescue is a non-rescue

channel; and

said channel decision unit makes the decision based

20   upon the non-rescue information of the ring type stored

in the ring-type storage means.

3.   The apparatus according to claim 2, wherein said

non-rescue information storage means stores the non-

rescue information only for working channels in a

25   prescribed direction among the channels that are the

object of rescue;

said channel decision unit decides channels of the

second group from among the working channels of said

direction;

said unrescuable failure discrimination unit
determines whether an unrescuable failure has occurred
in the channel of the second group; and

5   on the basis of main-signal cross-connect
information, said discrimination-result insertion means
interchanges the result of discrimination of the
channels of the second group and inserts the
interchanged result of discrimination in the main signal

10 of the corresponding channel after cross connect, this
insertion being performed in the working channels and
protection channels of the first and second directions.

4. The apparatus according to claim 1, wherein the
channels are STS channels in a synchronous optical

15 network;

said unrescuable failure discrimination unit
determines whether failure for which rescue by loop-back
is impossible has occurred in each virtual tributary
channel (VT channel) accommodated by an STS channel of

20 the second group; and

on the basis of main-signal STS cross-connect
information, said discrimination-result insertion means
interchanges a result of discrimination of said each VT
channel on a per-STS-channel basis and inserts the

25 interchanged result of discrimination in the
corresponding VT signal after STS cross connect.

5. The apparatus according to claim 1, further
comprising:

activate processing means for receiving the
discrimination result before it is interchanged based
upon the cross-connect information, monitoring whether
an unrescuable failure has continued in excess of a
5   predetermined period of time for every channel, and
monitoring whether a recovery from failure has been
accomplished; and

interchanging means for interchanging and
outputting result of monitoring on the basis of main-
10   signal cross-connect information.

6.   The apparatus according to claim 5, wherein the
channels are STS channels in a synchronous optical
network;

said unrescuable failure discrimination unit
15   determines whether failure for which rescue by loop-back
is impossible has occurred in each virtual tributary
channel (VT channel) accommodated by an STS channel of
the second group;

said activate processing means monitors whether an
20   unrescuable failure has continued in excess of a
predetermined period of time for every VT channel and
monitors whether a recovery from failure has been
accomplished for every TV channel; and

said interchanging means interchanges and outputs
25   result of monitoring of every VT channel on a per-STS-
channel basis on the basis of main-signal cross-connect
information.

7.   The apparatus according to claim 4, further

comprising:

a VT path protection switch having, for every VT channel, a service selector switch function which, when a failure has occurred in a first transmission path of

5 first and second transmission paths connecting two ring networks, performs rescue by selecting a signal that enters from the second transmission path; and

a service selector information generator for generating service selector information which specifies

10 that the VT path protection switch is to operate as service selector switch;

wherein on the basis of main-signal cross-connect information, said service selector information generator interchanges information indicating whether a channel

15 that is the object of rescue is the channel of the second group, generates service selector information for every VT channel by this interchange, and delivers the service selector information to said VT path protection switch.

20 8. The apparatus according to claim 7, wherein on the basis of main-signal STS cross-connect information, said service selector information generator interchanges information indicating whether a channel that is the object of rescue in STS working channel of a prescribed

25 direction is the channel of the second group, and interchanges this interchanged information concerning the channel of the second group on the basis of main-signal VT cross-connect information, thereby generating

service selector information for every VT channel.

9. A transmitting apparatus having an STS switch for
cross connecting an STS signal which accommodates a
plurality of virtual tributary signals (VT signals), and

5   two VT switches to which an STS signal, which has been
cross connected by the STS switch, is input upon being
split into respective halves, wherein said VT switches
replace VT pointers contained in the STS signal, VT-
channel signals following the replacement of the VT

10   pointers are passed between said VT switches and the VT
signals are then cross connected, said apparatus
comprising:

timing adjustment unit for adjusting multiframe
timing;

15   a VT pointer replacement unit for replacing VT
pointers using as a reference the multiframe timing that
has been adjusted;

means for passing VT-channel signals between said
VT switches after replacement of the VT pointers; and

20   a VT line switching unit for cross connecting the
VT channel signals;

10. The apparatus according to claim 9, wherein said
timing adjustment unit, which is provided in one of said
VT switches (a master switch), has (1) a multiframe

25   timing generator for generating a multiframe timing
pulse from a frame timing pulse, and (2) a timing pulse
generator for generating a reference multiframe timing
pulse of a prescribed width indicating a position one-

half frame ahead of the multiframe timing; and

said timing adjustment unit, which is provided in the other of said VT switches (a slave switch), has (1) a judgment circuit for sampling reference multiframe

5 timing pulses at high speed and, if a sampled value of a pulse has the same level a plurality of times in succession, judging that the pulse is a true reference multiframe timing pulse, and (2) a multiframe timing generator for adopting, as a multiframe timing pulse, a

10 frame timing pulse of the slave switch generated the first timing following detection of said reference multiframe timing pulse.